

REMARKS/ARGUMENTS

Claims 10-12 and 19-25 are pending.

Claims 1-9 and 13-18 have been cancelled.

Claims 19-25 have been added.

Support for the amendments is found in the claims and specification, as originally filed. Claim 19 combines the limitations of original claims 1, 3-6. and 9¹. Claim 20 comprises the limitations of claim 2. Claim 21 comprises the limitations of claim 7. Support for claims 22-25 can be found at pages 3, 9, 13, 14, 20-21, and 29. No new matter is believed to have been added.

Applicants filed an IDS on July 27, 2007. However, the Examiner has not returned a signed copy of the IDS with the Official Action. Applicants kindly request that the Examiner acknowledge the consideration of the IDS by returning an initialed and signed copy.

Claims 1-5, 8-9, 13-14, and 16-18 are rejected under 35 U.S.C. 102(e) over Davis, US 7,083,730.

Davis does not describe using a charge mosaic membrane after raw deep ocean water was concentrated by a reverse osmosis. Davis does not describe raw deep ocean water as comprising temperature sensitive organic substances and/or microorganisms. Davis does not describe concentrated raw water (after the first step) having a salt concentration from 10, 20 or 26 wt.% to a saturation solubility.

¹ Claim 19 is directed to a method of desalting raw water with at least a water-soluble salt contained therein, which comprises removing water from said raw water to concentrate said raw water; and removing at least a part of said water-soluble salt from the resulting concentrated raw water, wherein said raw water comprises at least one kind of alkali metal ions or alkaline earth metal ions, wherein said concentrated raw water has a salt concentration in a range of from 10 wt.% to a saturation solubility of said salt, wherein said first step is conducted by evaporation and/or by using a reverse osmosis membrane and said second step is conducted by using a charge mosaic membrane, and wherein said raw water is ocean deep water.

Rather, Davis discloses a method for desalting seawater by a reverse osmosis followed by an electrodialysis (col. 4). Davis describes that a concentration of salt after the first step is 6 wt.% (col. 19, line 65) and after the second step 20% (col. 9), 23 % (col. 20), 24.74% (col. 20), and 17.3% (col. 20).

Thus, Davis does not anticipate the claimed method. Applicants request that the rejection be withdrawn.

Claims 1-3, 7-9, and 13-14 are rejected under 35 U.S.C. 102(b) over Hassan, US 6,508,936.

Hassan does not teach concentrated raw water (after the first step) having a salt concentration in a range of from 10 (20 or 26) wt.% to a saturation solubility. Hassan does not teach a process comprising concentrating raw deep ocean water by an evaporation and/or a reverse osmosis followed by filtrating through a charge mosaic membrane. Hassan does not describe raw deep ocean water comprising temperature sensitive organic substances and/or microorganisms.

Rather, Hassan describes using the nanofiltration followed by other desalination methods (e.g., reverse osmosis) (col. 3).

Thus, Hassan does not anticipate the claimed method. Applicants request that the rejection be withdrawn.

Claims 1, 3, 5, 8-9, and 13-14 are rejected under 35 U.S.C. 102(b) over JP 61-061690.

JP 61-061690 does not teach concentrated raw deep ocean water in the first step of desalination having a salt concentration from 10 wt.% to a saturation solubility. JP 61-061690 does not teach using a charge mosaic membrane in the second step of desalination. JP 61-061690 does not describe raw ocean deep water comprising temperature sensitive organic substances and/or microorganisms.

Rather, JP 61-0616690 describes a multistep desalination comprising heating, condensation, evaporation, and cooling of seawater followed by a reverse osmosis (abstract).

Thus, JP 61-061690 does not anticipate the claimed method. Applicants request that the rejection be withdrawn.

Claim 6 is rejected under 35 U.S.C. 103(a) over Davis, US 7,083,730, and JP 08-276122 or Fukutomi, US 6,484,887.

Claim 6 has been cancelled. The limitation of claim 6 has been introduced into claim 19.

None of the references teach concentrated raw water (after the first step) having a salt concentration from 10, 20 or 26 wt.% to a saturation solubility of a salt, not to mentioned raw ocean deep water comprising temperature sensitive organic substances and/or microorganisms.

A high concentration of salt (from 10 wt.% to a saturation solubility) in raw water is important so that sterilization of water is conducted simultaneously with the desalination. Raw deep ocean water comprises microorganisms that can be killed by high content of salt. However, the content of salt in deep ocean water is already high and microorganisms are adapted to that condition. Therefore, to sterilize raw water while conducting desalination, a concentration of salt is from 10 wt.% to a saturation solubility in the first step of desalination (pages 13-14 of this specification).

Thus, Davis and JP 08-276122 or Fukutomi do not make the claimed method obvious.

Claims 10-11² rejected under 35 U.S.C. 103(a) over JP 61-0616690, GB 2234448, and JP 08-276122 or Davis, US 7,083,730.

² Claim 10 is directed to a method of desalinating ocean deep water comprising concentrating said ocean deep water by reduced-pressure evaporation until a concentration of a salt reaches a range of from 10 wt.% to a saturation solubility of said salt; desalting the resulting concentrated ocean deep water through a charge mosaic membrane until said concentration of said salt is lowered to from 0.5 to 12 wt%; concentrating the resulting

None of the references alone or in combination describe a method comprising concentrating raw deep ocean water to 10 wt.% of salt or higher, desalting the concentrate to reach salt concentration of 0.5-12 wt.%, concentrating again to achieve concentration of 10 wt.% to a saturation solubility of salt, and desalting again to reach salt concentration in water of 0.1-1.0 wt.%.

Further, none of the references alone or in combination describe a method comprising concentrating ocean deep water by a reverse osmosis until salt concentration is from 5 to 7 wt.%; followed by concentrating by a reduce-pressure evaporation to reach salt concentration of 10 wt.% or higher; and desalting by a charge mosaic membrane to reach salt concentration in water to 0.1-1.0 wt.%.

Also, none of the references disclose concentrating and desalting deep ocean water by reduced-pressure evaporation method followed by a charge mosaic membrane in the repetitive manner.

JP 61-0616690 describes a multistep desalination comprising heating, condensation, evaporation, and cooling of seawater followed by a reverse osmosis (abstract).

GB 2234448 describes purifying water by reduced-pressure evaporation (page 2).

JP 08-276122 describes a charge mosaic membrane for desalting water (abstract).

Davis discloses a method for desalting seawater by a reverse osmosis followed by an electrodialysis (col. 4).

desalted ocean deep water by reduced-pressure evaporation until said concentration of said salt reaches a range of from 10 wt.% to said saturation solubility of said salt; and desalting the resulting concentrated ocean deep water through a charge mosaic membrane until said concentration of said salt is lowered to from 0.1 to 1.0 wt.%.

Claim 11 is directed to a method of desalinating ocean deep water comprising concentrating said ocean deep water through a reverse osmosis membrane until a concentration of a salt reaches a range of from 5 to 7 wt.%; concentrating the resulting concentrated ocean deep water further by reduced-pressure evaporation until said concentration of said salt reaches a range of from 10 wt.% to saturation solubility of said salt; and desalting the resulting concentrated ocean deep water through a charge mosaic membrane until said concentration of said salt is lowered to from 0.1 to 1.0 wt.%.

Heating (e.g., from a heat condensation and electrodialysis) is not desirable for desalting raw deep ocean water because deep ocean water comprises thermosensitive organic substance (pages 2-4 of this specification).

Also, this specification describes that existing method of desalination, e.g., electrodialysis, reverse osmosis, ion exchange filtration, and a charge mosaic membrane, do not provide high degree of water purity and/or are not suitable for industrial use (pages 2-6). Applicants have developed a method providing unexpectedly high quality of water produced by industrial methods, wherein raw deep ocean water is concentrated to a high extent and desalinated to reach salt concentration in water of 0.1-1.0 wt.%. (pages 5-6, pages 34-35, pages 12-15, and the Examples).

Thus, the combination of teachings does not make the claimed method obvious. Applicants request that the rejection be withdrawn.

Claim 12 is rejected under 35 U.S.C. 103(a) over Davis, US 7,083,730, and JP 08-276122 or Fukutomi, US 6,484,887, Hassan US 6,508,936, and JP 2001029754.

Claim 12 is directed to a method of desalinating ocean deep water comprising concentrating said ocean deep water through a nanofiltration membrane until its volume is decreased to 1/5 to 1/50; and desalting the resulting concentrated ocean deep water through a charge mosaic membrane until concentration of said salt is lowered to from 0.1 to 1.0 wt.%.

None of the references alone or in combination describe a method wherein the nanofiltration achieves a volume decrease of from 1/5 to 1/50, and desalting by a charge mosaic membrane until concentration of salt is lowered to 0.1-1.0 wt.%.

This specification describes that existing method of desalination, e.g., electrodialysis, reverse osmosis, ion exchange filtration, and a charge mosaic membrane, do not provide high degree of water purity and/or are not suitable for industrial use (pages 2-6). Applicants develop a method providing unexpectedly high quality of water produced by industrial

methods, wherein raw ocean deep water is concentrated to a high extend and desalinated to reach salt concentration of 0.1-1.0 wt.%. (pages 5-6, pages 34-35, pages 12-15, and the Examples).

Thus, the combination of teachings does not make the claimed method obvious. Applicants request that the rejection be withdrawn.

Claim 15 has been cancelled. Applicants request that the rejection over JP 61-061690, JP 09-248429, and JP 63-287497 be withdrawn.

A Notice of Allowance for all pending claims is requested.

Respectfully submitted,

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